



## Spatial and temporal distribution of the malaria mosquito *Anopheles arabiensis* in northern Sudan: Influence of environmental factors and implications for vector control

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### Abstract:

**BACKGROUND:** Malaria is an important public health problem in northern Sudan, but little is known about the dynamics of its transmission. Given the characteristic low densities of *Anopheles arabiensis* and the difficult terrain in this area, future vector control strategies are likely to be based on area-wide integrated pest management (AW-IPM) that may include the sterile insect technique (SIT). To support the planning and implementation of future AW-IPM activities, larval surveys were carried out to provide key data on spatial and seasonal dynamics of local vector populations. **METHODS:** Monthly cross-sectional larval surveys were carried out between March 2005 and May 2007 in two localities (Dongola and Merowe) adjacent to the river Nile. A stratified random sampling strategy based on the use of Remote Sensing (RS), Geographical Information Systems (GIS) and the Global Positioning System (GPS) was used to select survey locations. Breeding sites were mapped using GPS and data on larval density and breeding site characteristics were recorded using handheld computers. Bivariate and multivariate logistic regression models were used to identify breeding site characteristics associated with increased risk of presence of larvae. Seasonal patterns in the proportion of breeding sites positive for larvae were compared visually to contemporaneous data on climate and river height. **RESULTS:** Of a total of 3,349 aquatic habitats sampled, 321 (9.6%) contained *An. arabiensis* larvae. The frequency with which larvae were found varied markedly by habitat type. Although most positive sites were associated with temporary standing water around the margins of the main Nile channel, larvae were also found at brickworks and in areas of leaking pipes and canals - often far from the river. Close to the Nile channel, a distinct seasonal pattern in larval populations was evident and appeared to be linked to the rise and fall of the river level. These patterns were not evident in vector populations breeding in artificial water sources away from the river. **CONCLUSION:** The GIS-based survey strategy developed in this study provides key data on the population dynamics of *An. arabiensis* in Northern State. Quantitative estimates of the contributions of various habitat types and their proximity to settlements provide a basis for planning a strategy for reducing malaria risk by elimination of the vector population.

**Source:** <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2698915>

### Resource Description

#### Exposure : ☐

weather or climate related pathway by which climate change affects health

# Climate Change and Human Health Literature Portal

Ecosystem Changes, Food/Water Quality, Temperature

**Food/Water Quality:** Other Water Quality Issue

**Water Quality (other):** Salinity

**Geographic Feature:** 

resource focuses on specific type of geography

Freshwater

**Geographic Location:** 

resource focuses on specific location

Non-United States

**Non-United States:** Africa

**African Region/Country:** African Country

**Other African Country:** Sudan

**Health Impact:** 

specification of health effect or disease related to climate change exposure

Infectious Disease

**Infectious Disease:** Vectorborne Disease

**Vectorborne Disease:** Mosquito-borne Disease

**Mosquito-borne Disease:** Malaria

**Intervention:** 

strategy to prepare for or reduce the impact of climate change on health

A focus of content

**Mitigation/Adaptation:** 

mitigation or adaptation strategy is a focus of resource

Adaptation

**Resource Type:** 

format or standard characteristic of resource

Research Article

**Timescale:** 

time period studied

Time Scale Unspecified

**Vulnerability/Impact Assessment:** 

## **Climate Change and Human Health Literature Portal**

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content